What is claimed is:

1. A vibrating magnetic separator having vibrating components and stationary components wherein the vibrating magnetic separator contains a pressure retaining flexible bellows to seal the process contents from leaking to the atmosphere and to isolate the vibrating components from the stationary components.

2. A vibrating magnetic separator comprising in combination:

A. an electromagnet;

B. a pressure vessel having an inlet and an outlet, said pressure vessel being mounted in the electromagnet;

C. a ferromagnetic matrix;

D. a vibrator for vibrating the ferromagnetic matrix said vibrator moving in a vertical direction, and

E. a bellows that connects the stationary components of the magnetic separator to the vibrating components of the magnetic separator and seals the process contents from leaking to the atmosphere.

3. The vibrating magnetic separator as claimed in claim 2 wherein the means of applying vibration to the matrix is a moveable shaft connecting the vibrator and the matrix.

4. A vibrating magnetic separator as claimed in claim 2 wherein the flexible bellows is a metal bellows that is useful above ambient temperature and pressure.

5. A vibrating magnetic separator as claimed in claim 2 wherein the flexible bellows has at least two plies.

6. A vibrating magnetic separator as claimed in claim 2 wherein there is present between two of the plies, failure detection means.

7. A vibrating magnetic separator as claimed in claim 1 wherein there is present at least one linear vibrator

8. A vibrating magnetic separator as claimed in claim 2 wherein there is present at least one linear vibrator.

9. A magnetic separator apparatus comprising in combination:

a. a pressure vessel container having a top half, a lower half, and a lower half terminus, said pressure vessel container being surmounted by a pressure vessel lid flange said pressure vessel container having a vertical wall, said pressure vessel lid flange having a centered opening therethrough wherein there is a shaft seal located in said centered opening;

b. at least one feed nozzle mounted on the pressure vessel container for feeding material to the pressure vessel container;

c. a matrix located in the lower half of the pressure vessel container, said matrix being supported in the pressure vessel container as a cartridge;

d. an electromagnetic apparatus encircling the pressure vessel container on the outside of the pressure vessel container wall, and at the location of the matrix, a layer of thermal insulation located between said electromagnetic apparatus and the pressure vessel container wall;

e. a first support mechanism mounted on the pressure vessel lid flange for supporting a vibrator mounting frame, said vibrator mounting frame having a centered opening therethrough;

f. a second support mechanism surmounted on the vibrator mounting frame for supporting at least one lower control spring and lower control spring support mechanism, said second support mechanism also supporting a magnet vibrator casing containing a magnet vibrator, said magnet vibrator and magnet vibrator casing having centered openings therethrough, and surmounted on the magnet vibrator casing, a third support mechanism, there being mounted on said third support mechanism a support plate having surmounted thereon a fourth support mechanism, there being supported on the fourth support mechanism, at least one upper control spring having an upper surface;

g. a unitary moveable vertical shaft having a lower end and an upper end, said unitary moveable vertical shaft being held at its lower end by the matrix plate, said unitary moveable vertical shaft extending upwardly through the pressure vessel lid flange centered opening and the shaft sea located in the pressure vessel lid flange, extending upwardly through the center of a bellows, extending upwardly through the vibrator mounting frame centered opening, extending upwardly through the lower control spring, extending upwardly through the magnet vibrator centered opening, extending upwardly through the upper control spring, and terminating at essentially the upper surface of the upper control spring;

h. said bellows being surmounted on the pressure vessel lid flange and being supported by a bellows upper support mechanism that surrounds the unitary moveable vertical shaft;

i. an clean gas purge apparatus comprising an clean gas purge inlet located in the pressure vessel lid flange, which purge opens into a purge space formed by the shaft seal as the floor, the pressure vessel lid flange as the side and the bellows as the top, there being a small opening where the shaft seal meets the unitary vertical shaft to enable the inert gas to flow into the pressure vessel container;

j. the pressure vessel lid flange having mounted on the lower half terminus, a discharge cone, said discharge cone having a lower end, there being mounted on the lower end of the discharge cone, a controllable discharge nozzle.

10. A magnetic separator apparatus comprising in combination:

(i) a pressure vessel container having a top half, a lower half, and a lower half terminus, said pressure vessel container being surmounted by a pressure vessel lid flange said pressure vessel container having a vertical wall, said pressure vessel lid flange having a centered opening therethrough wherein there is a shaft seal located in said centered opening;

(ii) at least one feed nozzle mounted on the pressure vessel container for feeding material to the pressure vessel container;

(iii) a matrix located in the lower half of the pressure vessel container, said matrix being supported in the pressure vessel container by a matrix plate;

(iv) an electromagnetic apparatus encircling the pressure vessel container on the outside of the pressure vessel container wall, and essentially at the location of the matrix;

(v) a layer of thermal insulation located between said electromagnetic apparatus and the pressure vessel container wall;

(vi) a first support mechanism mounted on the pressure vessel lid flange for supporting at least one lower control spring support mechanism and lower control spring;

(vii) a second support mechanism surmounted on the lower control spring support mechanism, said second support mechanism supporting a magnet vibrator casing containing a magnet vibrator, said magnet vibrator and magnet vibrator casing having centered openings therethrough; and surmounted on the magnet vibrator casing, a third support mechanism, there being mounted on said third support mechanism at least one upper control spring support mechanism and at least one upper control spring;

(viii) ) a containment bellows being surmounted on the pressure vessel lid flange and being supported by an upper support mechanism that surrounds a unitary moveable vertical shaft;

(ix) a fourth support mechanism surmounted on the upper control spring support mechanism, said fourth support mechanism being surmounted by a top support plate, said top support plate supporting a balance bellows, said balance bellows being supported by a lower support mechanism that surrounds the unitary moveable vertical shaft;

(x) the unitary moveable vertical shaft having a lower end and an upper end, said unitary moveable vertical shaft being held at its lower end by the matrix plate, said unitary moveable vertical shaft extending upwardly through the pressure vessel lid flange centered opening and the shaft seal located in the pressure vessel lid flange, extending upwardly through the center of the containment bellows, extending upwardly through the lower control spring and lower control spring support mechanism, extending upwardly through the magnet vibrator centered opening, extending upwardly through the upper control spring support mechanism and upper control spring, and extending upwardly through the balance bellows and terminating at essentially the lower surface of the top support plate;

(xii) a clean gas purge apparatus comprising a clean gas purge inlet located in the pressure vessel lid flange, which purge opens into a purge space formed by the shaft seal as the floor, the pressure vessel lid flange as the side and the containment bellows as the top, there being a small opening where the shaft

seal meets the unitary vertical shaft to enable the clean gas to flow into the pressure vessel container;

(xiii) a pressure balancing tube, said pressure balancing tube being openly connected from the containment bellows to the balance bellows;

(xiv) the pressure vessel lid flange having mounted on the lower half terminus, a discharge cone, said discharge cone having a lower end, there being mounted on the lower end of the discharge cone, a discharge nozzle.

11. A process of treating silicon-containing solid material used in a reactor for producing chlorosilanes, the process comprising subjecting the silicon-containing solid material that has been used in said reactor, to a magnetic separator apparatus as claimed in claim 2 to separate constituents in the silicon-containing solid material into a magnetic portion and a non-magnetic portion.

12. A process of treating silicon-containing solid material, the process comprising:

(I) removing silicon-containing solid material from a fluid bed of a fluid bed reactor;

(II) subjecting the silicon-containing solid material to a magnetic separator apparatus as claimed in claim 2 to separate constituents in the silicon-containing solid material into a magnetic portion and a non-magnetic portion;

(III) returning the non-magnetic portion of the silicon-containing solid material to a fluid bed of a fluid bed reactor.

13. A process for the manufacture of chlorosilanes, said process comprising:

(I) treating silicon-containing solid materials that have been used in a reactor that is used for the manufacture of chlorosilanes by subjecting the silicon-containing solid materials to a magnetic separator apparatus as claimed in claim 2 to separate constituents in the silicon-containing solid material into a magnetic portion and a non-magnetic portion and

(II) removing the magnetic portion of the silicon-containing solid materials from the reactor.

14. A process for the preparation of chlorosilanes, the process comprising:

(I) providing a fluid bed reactor;

(II) charging the fluid bed reactor with

(i) comminuted silicon;

(ii) at least one catalyst for a Direct Process reaction;

(iii) at least one promoter for the Direct Process reaction;

(III) thereafter, providing an alkyl chloride to the fluid bed reactor to form a fluid bed in the reactor;

(IV) allowing the comminuted silicon, catalyst, promoter and alkyl chloride to interact and react to produce alkylchlorosilanes at a desired ratio and at a desired rate;

(V) thereafter, upon a certain increase in the desired ratio or a certain reduction in the desired reaction rate, subjecting the contents of the fluid bed to a process comprising treating the fluid bed contents by subjecting the fluid bed contents to a magnetic separator apparatus as claimed in claim 2 to separate constituents in the fluid bed contents into a magnetic portion and a non-magnetic portion and removing the magnetic portion of the fluid bed contents from the process.

15. A process for the preparation of chlorosilanes, the process comprising:

(I) providing a fluid bed reactor;

(II) charging the fluid bed reactor with

(i) comminuted silicon;

(ii) at least one catalyst for a Direct Process reaction;

(iii) at least one promoter for the Direct Process reaction;

(III) thereafter, providing an alkyl chloride to the fluid bed reactor to form a fluid bed in the reactor;

(IV) allowing the comminuted silicon, catalyst, promoter and alkyl chloride to interact and react to produce alkylchlorosilanes at a desired ratio and at a desired rate;

(V) thereafter, upon a certain increase in the desired ratio or a certain reduction in the desired reaction rate, subject the contents of the fluid bed to a process comprising treating the fluid bed contents by comminuting the fluid bed contents to reduce the average particle size of the solids therein and thereafter, subjecting the milled fluid bed contents to a magnetic separator apparatus as claimed in claim 2 to separate constituents in the

fluid bed contents into a magnetic portion and a non-magnetic portion and thereafter, removing the magnetic portion of the fluid bed contents from the process and continuing the Direct Process.

16. A process for the preparation of chlorosilanes, the process comprising:

(I) providing a fluid bed reactor;

(II) charging the fluid bed reactor with

(i) comminuted silicon;

(ii) at least one catalyst for a Direct Process reaction;

(iii) at least one promoter for the Direct Process reaction;

(III) thereafter, providing an alkyl chloride to the fluid bed reactor to form a fluid bed in the reactor;

(IV) allowing the comminuted silicon, catalyst, promoter and alkyl chloride to interact and react to produce alkylchlorosilanes at a desired ratio and at a desired rate;

(V) thereafter, upon a certain increase in the desired ratio or a reduction in the desired reaction rate, subject the contents of the fluid bed to a process comprising treating the fluid bed contents by reducing and removing impurities from the solids portion of the fluid bed contents by subjecting the fluid bed contents to a size classification method using an aerodynamic centrifugal classifier process and thereafter subjecting the purified fluid bed contents to a magnetic separator apparatus as claimed in claim 1 to separate constituents in the fluid bed contents into a magnetic portion and a non-magnetic portion and removing the magnetic portion of the fluid bed contents from the fluid bed reactor and continuing the Direct Process.

17. A process for the preparation of chlorosilanes, the process comprising:

(I) providing a fluid bed reactor;

(II) charging the fluid bed reactor with

(i) comminuted silicon;

(ii) at least one catalyst for a Direct Process reaction;

(iii) at least one promoter for the Direct Process reaction;

(III) thereafter, providing an alkyl chloride to the fluid bed reactor to form a fluid bed in the reactor;

(IV) allowing the comminuted silicon, catalyst, promoter and alkyl chloride to interact and react to produce alkylchlorosilanes at a desired ratio and at a desired rate;

(V) thereafter, upon a certain increase in the desired ratio or a reduction in the desired reaction rate, subject the contents of the fluid bed to a process comprising treating the fluid bed contents by comminuting the fluid bed contents to reduce the average particle size of the solids therein and reducing and removing impurities from the milled solids portion of the fluid bed contents by subjecting the fluid bed contents to a size classification method using an aerodynamic centrifugal classifier process and then subjecting the purified fluid bed contents to a magnetic separator apparatus as claimed in claim 1 to separate constituents in the fluid bed contents into a magnetic portion and a non-magnetic portion and then removing the magnetic portion of the fluid bed contents form the fluid bed of the fluid bed reactor and continuing the Direct Process.

18. A process for the preparation of chlorosilanes, the process comprising:

(I) providing a fluid bed reactor;

(II) charging the fluid bed reactor with

(i) comminuted silicon;

(ii) at least one catalyst for a Direct Process reaction;

(iii) at least one promoter for the Direct Process reaction;

(III) thereafter, providing an alkyl chloride to the fluid bed reactor to form a fluid bed in the reactor;

(IV) allowing the comminuted silicon, catalyst, promoter and alkyl chloride to interact and react to produce alkylchlorosilanes at a desired ratio and at a desired rate;

(V) thereafter, upon a certain increase in the desired ratio or a certain reduction in the desired reaction rate, subject the contents of the fluid bed to a process comprising treating the fluid bed contents by abrading the fluid bed contents to remove impurities from the surface of the fluid bed contents particle and thereafter, subjecting the abraded fluid bed contents to a magnetic separator apparatus as claimed in claim 1 to separate constituents in the fluid bed contents into a magnetic portion and a non-magnetic portion and thereafter, removing the magnetic portion of the fluid bed contents form the process and continuing the Direct Process.